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Government Allocation of Property Rights: Why and How

Elizabeth Rolph

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PREFACE

This report examines twelve regulatory programs that confer some right or benefit on a particular group to determine the design, implementation, and evolutionary characteristics of such programs. The research was done in support of a larger study intended to assist the U.S. Environmental Protection Agency (EPA) in choosing among alternative ways to restrict the production of chlorofluorocarbons (CFCs).

This research, which was supported under EPA Contract 68-01-6236, contributes to a growing body of EPA-sponsored Rand research on CFC regulation. Earlier studies examined the choice between mandatory control and economic incentives, as strategies for CFC regulation, and detailed the specific outcomes of an economic incentive strategy that would restrict future U.S. annual CFC production to the 1980 level.

Other Rand publications concerning CFC regulation include:

- A. R. Palmer et al., Economic Implications of Regulating Chlorofluorocarbon Emissions from Nonaerosol Applications, R-2524-EPA, June 1980.
- A. R. Palmer and T. H. Quinn, Allocating Chlorofluorocarbon Permits: Who Gains, Who Loses, and What Is the Cost?, R-2806-EPA, July 1981.
- W. E. Mooz and T. H. Quinn, Flexible Urethane Foams and Chlorofluorocarbon Emissions, N-1472-EPA, June 1980.

- K. A. Wolf, Regulating Chlorofluorocarbon Emissions: Effects on Chemical Production, N-1483-EPA, August 1980.
- A. R. Palmer and T. H. Quinn, Economic Impact Assessment of a Chlorofluorocarbon Production Cap, N-1656-EPA, February 1981.

For a summary of findings from the earlier research, see:

- A. R. Palmer et al., Economic Implications of Regulating Nonaerosol Chlorofluorocarbon Emissions: An Executive Briefing, R-2575-EPA, July 1980.

SUMMARY

As population growth and new patterns of consumption place mounting stress on resource reserves and on the environment, policymakers have become increasingly interested in ways to limit resource use. One obvious mechanism currently receiving considerable attention is the permit program. Under a permit program, the government assigns consumption or use rights to a particular group. At the same time, the program caps the consumption or use allowed by recipients of the rights.

Programs that confer rights upon a particular subgroup of the population raise an interesting and unique set of concerns. They single out a select group of citizens and confer upon them a right that has value. Who should this group be? On what basis should the allocation be made? Should recipients pay for the benefits? What should the nature of the benefits be? The purpose of our research is to understand how the political process has dealt with these questions in the past and with what results.

The study is exploratory and is based on information drawn from 12 cases, some old, some new; but all are examples of government programs that confer rights on a select subgroup. Our analysis focuses on characteristics of the program designs and, to a lesser degree, on the administrative and evolutionary characteristics of our sample cases. For each case, we ask the following questions: Who receives the right? On what basis is the allocation made? How complete are the property rights that are conferred? And what special trends in program development are discernible?

Close scrutiny of the 12 sample cases suggests that all programs that confer rights or benefits are motivated by one of three objectives. Some exist to move publicly owned resources into the private sector for development. Some exist because patterns of use have created externalities either for the user group or for the public, and the government is called upon to regulate that use. And finally, rights are often conferred upon a group to protect that group from the deleterious effects of a market shift.

Once cases are typed according to their motivating objective, clear patterns in design emerge. Although the allocation criteria determining who receives rights vary in cases that distribute publicly owned goods, in all cases the government attempts to extract reasonable compensation for the benefit conferred. All programs to control externalities and to protect producers confer benefits on historic producers or owners of the resource. Consumer protection programs use all three allocation criteria--historic use, actual use, and best use. And programs designed to equalize the effect of change on an industrial subgroup base their allocation of rights on actual use.

The criteria determining the quantity of rights a recipient will get show a similar clear pattern. In programs that allocate rights to exploit publicly owned resources, rights are allocated on the basis of compensation (either monetary or behavioral) extracted from the recipient. Programs controlling externalities and protecting producers allocate rights on the basis of historic use, actual use, and need, but with a strong propensity to allocate on the basis of historic use. And programs designed to equalize the effects of change on an industrial subgroup allocate rights on the basis of actual use.

These patterns appear to reflect a consistent effort to maintain the distributional status quo; that is, not to create winners or losers. And where losers are inevitable, the programs distribute losses evenly so as to maintain old structural relationships.

The characteristics defining the nature of rights conferred in the programs we examined show less consistent patterns, but they do suggest some patterns. Policymakers clearly are reluctant to allocate complete property rights. Although a number of programs do permit the unrestricted sale of rights, others either link the transfer of the right to the sale of the real property to which the right attaches or forbid transfer altogether. Programs allocating rights to best uses--uses that meet some test of social utility--cannot then let those rights be freely transferred. Restrictions on the salability of rights also seem to occur in cases where sale would make the value of the conferred right highly visible, thereby inviting attack from consumer or taxpayer groups.

Rights generally appear to be conferred in perpetuity or on a long-term basis, thereby reducing administrative costs and the politically distasteful chore of remaking hard allocation decisions. Certain allocation provisions, however, preclude the allocation of long-term rights. If rights are allocated to actual users or on the basis of actual use, they must be reallocated reasonably frequently. The term of the rights allocated to best users must also permit the regulator to evaluate the recipient's performance periodically and to withhold rights from those not meeting standards. In practice, however, our cases suggest that reallocation to new best users is politically difficult and unlikely.

Our case material not only suggests that the type of case strongly influences program design, but also that certain allocation decisions lead inexorably to other design requirements that may be costly and problematic. Perhaps the best example is manifest in programs that allocate rights to best users. Once that choice is made, then it follows that rights cannot be transferred, that recipients' behavior must be constantly reviewed, and that allocation and monitoring procedures will be very complex and costly. Another example is cases that call for repeated reviews and adjustments. These cases offer the continuing opportunity to serve new policy objectives by tacking on new beneficiaries. The programs thus grow in scope and complexity.

Although this study is exploratory, its results strongly suggest that we have much to learn from similar, more detailed program comparisons. A more comprehensive understanding of what objectives and constraints guide policymakers in their choices of policy options and of the implementation and evolutionary consequences that specific program design choices hold would enhance the usefulness of policy analysis immeasurably.

ACKNOWLEDGMENTS

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I. INTRODUCTION

OVERVIEW

Today, as we challenge the earth's reserve of resources and the environment's capacity to absorb waste, government is increasingly called upon to arbitrate private use and consumption. Thus, policymakers share a growing interest in programs that limit access to dwindling resources. Although regulatory in purpose, some of these are not the conventional standard-setting programs. Rather, they are programs to confer on a select group property rights to a resource or an activity, thereby limiting its use. Such programs are the subject of this study.

Governments have conferred rights or benefits on specific groups among its people since time immemorial. Rulers or their representatives often conferred upon a subgroup of subjects hunting rights, rights to engage in certain businesses or professions, and rights to numerous other goods or activities. Modern, democratic governments confer similar rights according to the dictates of the democratic process. The political science literature is replete with studies of how such rights come to be conferred. These studies explore the exercise of interest group power and the processes by which governments choose beneficiaries and confer benefits.

In contrast, we are interested not in exploring the process of conferral but in identifying the patterns inherent in this type of policy. We expect that any patterns that underlie such policies will shed some light on the political imperatives that constrain program

design decisions and outcomes. With a better understanding of the imperatives, the analyst is then better equipped to innovate more acceptable and effective policies. Therefore, the purpose of our research is to examine existing programs that confer special rights on a limited number of recipients to learn what requirements shape them. What situations seem to call for policies that confer rights? Who are the recipients of such rights and, more generally, what are the overall distributional consequences of the programs? What does the beneficiary receive? And, finally, do the implementation consequences and evolutionary patterns of these programs tend to alter the distributional outcomes in any systematic ways?

In addressing the first two questions, we expect to identify the types of policy problems that the conferring of rights seems tailored to address. Then in the context of that typology, we intend to explore the distributional consequences of the programs--who wins and who loses--hoping to uncover some patterns that will suggest the political dictates at work.

The question "What does the beneficiary receive?" asks what is the nature of the property right being conferred. A holder's property right may be viewed as a bundle of legally permitted uses of the object of the right. A property right may be complete, entitling the holder to use it for any legal purpose, sell it for any price he can get, hold it in perpetuity, and so forth. Or a right may be partial or limited, entitling the holder to only specified uses or use over a limited period of time.[1] The completeness of the property right generally determines

[1] This discussion of property rights rests on Alchian (1961). In his paper, Alchian defines property rights in terms of the legally permitted uses the owner can make of the object of the right. The value of the right will then vary according to the range of permitted uses inherent in it. See pp. 10-16.

its value to the owner. Therefore, in our analysis, we ask two questions regarding the nature of a conferred property right. First, what bundle of rights--what uses of the property--does a recipient get? Can he sell part or all of it? Can he simply hold it or must he use it some way? Answers to these and similar questions help define what the government may be willing to allocate. Second, what is the duration of the recipient's ownership of the right? The answer to this question further defines the value of the right and what the government may be willing to allocate.

Finally, we are interested in exploring the implementation consequences and evolutionary patterns of various programs that allocate rights to gain additional information on the program's distributive consequences and effectiveness. For example, it may be true that in operation, a program allocates a quite different bundle of rights to a quite different set of recipients than the original program may have specified. Or it may be true that some types of programs consistently undergo certain evolutionary changes that alter their initial distributive consequences.

Because there is little research in this area upon which to build, our work is necessarily exploratory. More exactly, it is an attempt to see if, indeed, common design and implementation practices link regulatory programs and if so, what lessons such patterns might hold for those designing future programs.

METHODOLOGY

Because our research effort is exploratory, we rely on a number of case studies to suggest hypotheses that can yield answers to our questions. We have chosen to examine only the essential features of a relatively large sample of cases rather than to conduct in-depth analyses of a few cases on the assumption that the larger sample demonstrates patterns more effectively. Our sample includes 12 cases chosen primarily because they were well-known and information on them was readily available. The oldest case in the group is a regulatory program that has been in force since 1927. The newest cases are still in their formative stages. The cases have been chosen from the narrow range of those where a property right has been conferred (or denied) to achieve a regulatory goal, although they may have varying purposes and designs.

The fact that program objectives vary should not affect our ability to search for design and implementation patterns, since programs that confer rights must answer similar questions regardless of their purpose. The prime purpose of some programs might be to control injurious side effects by restricting the use of some resource. The purpose of others might be to subsidize some group to moderate the effect of economic change. But in spite of their different purposes, these programs are likely to have similar components. For example, in several of the nation's large cities, taxicabs must have medallions (permits) to operate. The number of medallions issued is limited. The purpose of the medallion program is to guarantee licensees an "acceptable income. A very different purpose would lie behind, say, a federal program to

restrict the use of chlorofluorocarbons (CFCs). However, one element of a federal program might well be to require permits for the manufacture or use of CFCs. Then the government would face many of the same secondary policy choices that cities face when licensing taxicabs. How and to whom should permits be distributed? Should rights be separable from the firm and independently salable or should they be transferrable only with the firm or plant? If the permit requirements make monopoly profits possible, how is that problem to be dealt with?

Three elements appear to determine the basic structure of a regulatory program that confers rights: Who is the recipient? How much does he receive? And, what does he receive? Table 1 presents an illustrative set of design alternatives for these three elements.

Program designers have considerable latitude in designating recipients. A recipient might be chosen at random through, say, a lottery. He might be the highest bidder in an auction. He might be a

Table 1

ILLUSTRATIVE PROGRAM DESIGN ALTERNATIVES

Recipients	Basis for Allocations	Nature of Property Rights	
		Transferability	Duration
Random distribution	What person pays for	Salable	In perpetuity
Highest bidder	Historic use	Transferable with related real property	Long term
Best user	Actual use		Short term
Historic user	Discretionary allocation	Not transferable	
Actual user	Capital stock		
	Workers employed		

best user--an applicant promising to perform the greatest social service in return for the benefit. He might be the historic producer or user--the person or firm who at some specified date in the past produced or consumed the resource. Or he might be the actual user--the person currently consuming or producing the resource during the period for which the right is conferred. Conferring benefits on actual users allows new market entrants to be eligible recipients, whereas conferring them on historic users restricts eligibility to those engaged in the activity during the identified base period.

When allocating rights, some characteristic must provide the basis for determining the amount of the allocation. How much should each recipient get? Again, the regulator's options are many. Recipients might receive whatever they are willing to buy. On the other hand, rights might be conferred on the basis of a fixed period of historic use, established over some specified base period, or they might be conferred on the basis of a fluctuating pattern of actual use. They might also be conferred, for instance, on the basis of historic or actual capital stock or number of workers employed.

Beyond identifying the recipient and the basis of making the allocation, a program must define the completeness of the property right being conferred. Can the recipient sell the right separately from the other assets he owns? If not, can it be transferred at all--say as part of the sale of his firm? For what period is the right or benefit valid? Once conferred, is it owned in perpetuity? Or is it owned for a defined long- or short-term period, after which time the right will be redistributed?

Regardless of a program's original purpose, similar design characteristics probably beget similar implementation characteristics and problems. What might such a program cost to run? By what process are "exceptions" made? In short, exploring a number of cases that may be different in purpose or in overall design should, nonetheless, be instructive.

If the case analyses are to be useful in understanding certain key issues in program design and implementation, they must be organized around a consistent set of questions. Only then can one identify common choices and outcomes. We examined our cases in terms of these issues--program design, program implementation, and program evolution. The questions asked to determine program design include: Who received benefits? Were there obvious losers? On what basis were the benefits conferred? How complete were the rights conferred? Were they salable or transferable? Those questions central to program implementation include: What did the program cost to administer? What distributive biases emerged in implementation? Because the case studies themselves led to the development of the analytic framework, and because information was more accessible for some cases, the useful information we have on the 12 cases is uneven. It does, however, cover most of the questions most of the time.

The case study methodology, to be sure, has its weaknesses as well as its strengths. It can be argued that each case is "idiosyncratic," because any program configuration will depend primarily upon the particular interest groups that are affected--their balance of support and opposition. Moreover, collecting a reasonable sample of cases

necessitates using old as well as new cases. Including old cases may be useful, because they will suggest evolutionary patterns. But, to the degree that design choices were based on values different from those currently dictating political choices, old cases may mislead us.

On the other hand, case analyses should illuminate policy constraints and preferences that otherwise might not be identified or inferred, because our understanding of the choice process is limited. And if one does observe common themes over a variety of cases and time periods, that should strongly suggest some fundamental policy constraints. On balance, then, the broad case study approach seems well suited to this exploratory effort.

ORGANIZATION

We present our results in three following sections. Section II gives a brief summary of each of the 12 cases based on information that addresses our analytical questions. This information is presented in some detail, since it provides the data base for our analysis and may be useful to researchers who want to extend our investigation. (The reader with no particular interest in program details may want to skip this section). Section III summarizes the case study results on the dimensions in question and describes patterns we observed. Section IV briefly suggests the implications that our research results may have for the policy analyst.

II. CHARACTERISTICS AND REDISTRIBUTIONAL EFFECTS OF THE CASE STUDIES

This study is based on the systematic examination of 12 programs that conferred rights or benefits upon a small group of recipients. In this section, we outline the characteristics of those programs, their distributional effects, and, to a modest degree, their implementation history. This information is the raw material of the analysis. But before undertaking case descriptions, we should place the cases in an overall framework that suggests many of the characteristics they will have.

Regulatory programs that confer rights or benefits appear to be motivated by one of three objectives. Some exist to move publicly owned resources into the private sector for development. In these cases, the government has laid claim to a communal resource, that resource most often being land, and later wants to pass it on to the private sector for development. In other cases, present use patterns create externalities either for the user group or for the public, and the government is called upon to regulate that use. Finally, rights are often conferred as part of a subsidy program to protect a particular group from the deleterious effects of shifting market conditions. The shift might result from natural changes or from a change induced by other government intervention.

Table 2 lists the cases in our study sample and breaks them down by type. Those falling into the last category are further broken down by recipient of the protection.

Table 2

PROGRAMS IN SAMPLE BY TYPE

Programs to Develop Public Resources	Programs to Control Externalities	Programs to Moderate Market Shifts		
		Producer Protection	Consumer Protection	Intra-Industry Transfer
Off-shore leases (DOI)	Allocation of broadcast spectra (FCC)	Truck operating authorities (ICC)	Oil price control (FEA, DOE)	Oil quota program entitlements (DOI)
United Kingdom off-shore leases	Allocation of groundwater rights in California Allocation of Development Rights (California Coastal Commission) California's Air Pollution Rights Program	Acreage allotments (DOA)	Natural gas producer price control (FPC)	Oil price control entitlements (DOE)

NOTE: DOA - Department of Agriculture, DOE - Department of Energy
DOI - Department of Interior, FCC - Federal Communications Commission
FPC - Federal Power Commission, and
ICC - Interstate Commerce Commission.

PROGRAMS TO DISTRIBUTE THE RIGHT TO DEVELOP PUBLIC RESOURCES

As noted in Table 2, our study population includes two programs to develop scarce, publicly owned resources: the U.S. government off-shore oil program and the United Kingdom's off-shore oil leasing program.[1] These two programs are summarized briefly below.

[1]Inclusion of a U.K. program in this study is somewhat

Federal Off-Shore Leases

The Department of Interior's off-shore oil and gas leasing program is a very straightforward mechanism for transferring rights from the public to the private sector.

The Outer Continental Shelf Lands Act, passed in 1953, requires that leases for sites on the Continental Shelf or in areas with proven reserves must be auctioned. Anyone is eligible to receive a lease. Bidding can be on either of two bases--cash bonuses plus royalties or simply royalties. The former is thought to favor the large developers, because they have greater cash reserves than the small developers.[2] The states also often auction development rights to their off-shore holdings. In 1969 Alaska realized $900 million from its auction of the Prudhoe Bay sites.

Congress has shown no discomfort with the auction mechanism in this context. To the contrary, most Congressional debate on the subject has centered on how to sharpen the auction competition, enabling the government to enjoy larger receipts. Concerned that the large petroleum producers may enjoy a bidding advantage, Congress has threatened, on occasion, to pass legislation requiring more royalty bidding.

Federal leases run for five years, just what a developer needs to explore and develop a property. The leaseholder has all the exploratory and development rights assigned to him in his lease, and once he develops the site, he is entitled to extend his lease on the terms

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problematic, but we decided to keep this example. It is the clearest of the "best user" allocation programs we saw, and certainly not unique to the U.K. In fact, our spectrum allocation case attempts to follow the same model, but unsuccessfully. See below.

[2] Kenneth Dam disputes this assumption, arguing that a good small developer would have access to capital as well. See Dam (1976).

agreed to in the auction. Only after a tract is developed may the lessee sell his lease. Therefore, companies cannot buy up leases and hold them for speculation or future use.

United Kingdom Off-Shore Leasing Program

The system of off-shore leasing adopted by the United Kingdom in the 1960s stands very much in contrast to the U.S. system.[3] The United Kingdom employed a discretionary allocation system under which leases were allocated to the best users. Applicants were judged on the basis of nationality and speed of proposed development. Over the years, the list of criteria expanded in support of other national policy objectives. Both the government and the recipients preferred discretionary allocation to lease auction--the government because it could pursue a major policy objective (speeding development) and the oil companies because leases were free.

To increase the availability of leaseholds, the government broke the fields into smaller less efficient blocks, insuring that there were leases for most applicants. This practice suggests that those making the allocations felt somewhat discomfited when turning applicants away.

The U.K.'s off-shore lease program provided for new entrants in a curious way. Every six years leaseholders had to surrender at least one-half of their leased lands for reissue to new applicants. The government thus assured future access for new developers, albeit to the less desirable tracts.

According to the rules, leases were not transferable, although companies circumvented the restriction by selling "shares" in projects

[3] This discussion of the U.K.'s off-shore leasing program relies on Dam (1976).

and capitalizing the value of the lease in the share price. To guarantee that leaseholders were British and that they intended to develop the site, leases were not freely transferable. Free transfer of leases would have highlighted the substantial windfall the government had conferred upon the leaseholder, possibly resulting in severe negative political repercussions.

In fact, several years after the leasing program began, the government auctioned a block of leases and to its chagrin netted $37 million.[4] The auction was not repeated. The auction did, however, prompt a major government effort to recapture a greater share of the value inherent in the leases. After several less effective attempts, the United Kingdom finally adopted the Oil Tax Act of 1975, a flat rate tax levied on a field, to recoup benefits for the government.[5]

PROGRAMS TO CONTROL EXTERNALITIES

The second category in our typology includes four programs to control externalities; the Federal Communications Commission's program to allocate spectrum rights to radio broadcasters, the allocation of groundwater rights in California, the California Coastal Commission's development rights program, and California's air pollution rights, banking, and transfer program. In all these cases, government is called upon to allocate user rights as a means of limiting a production or consumption activity that imposes undue costs either on the user group or on the community at large.[6] The cases are outlined below.

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[4] Dam (1976), pp. 25-28.

[5] Earlier efforts included forcing developers of gas to sell to the U.K.'s Gas Board at controlled prices. These low prices were then passed on to the consumer.

[6] It is worth noting that "government" is used to refer to all three branches, not just the executive or the legislative branches. In fact, the judiciary plays an instrumental role in one case.

Allocation of Spectrum Rights to Broadcasters

By the early 1920s, congestion in the broadcast frequency range had become intolerable. In the period March-November 1922 the number of radio stations jumped from 60 to 564. The broadcasters themselves pleaded with government to take on the onerous task of reducing their ranks, allocating broadcast rights to the survivors, and regulating future entry and use. In 1927, Congress passed the National Radio Act and created the Federal Radio Commission to do just that.

The act required all broadcasters to be licensed and empowered the commission to set the terms of licenses (operating frequencies, power, hours of operation) and to issue licenses to broadcasters on the basis of "public convenience and necessity." The act further affirmed (as had several prior legislative measures) that broadcast rights in no way constituted property rights. The "ether" or air waves belonged to the public and the licensee was a trustee of a public resource. In short, the commission was empowered to start from scratch--to assume no prior ownership or rights and to distribute a limited number of licenses to the broadcasters it judged would best serve the public interest. In 1934 Congress passed the Federal Communications Act expanding the authority of the commission but maintaining the same basic licensing provisions for broadcasters.[7]

Understandably, the national commission proved reluctant to force broadcasters out of business with no consensus on criteria for allocating or denying rights. Instead of cutting the 600 stations Congress had thought might need cutting, the commission at first ordered 13 off the air and later another 62.[8] Then it tried to "make do" by

[7] See Coase (1959).
[8] Edelman (1950), p. 36.

reducing broadcast power, by moving stations to new frequencies to reduce interference, and by requiring frequency time-sharing.

In the political environment of the real world, the FCC has also found it very difficult to make decisions consistent with its original mandate. Not only has the commission allocated licenses to historic users, but these licenses have assumed the character of quasi-property rights. Original licensees kept their licenses, and the commission still grants license renewal requests almost without exception.[9] Only when the FCC can allocate new frequencies are they given to a best user.

Because Congress expressly denied that licensing conferred a property right, licensees have had to renew their licenses every three years. And at each renewal, they must demonstrate to the commission that they are acting in the public interest. Because allocation of the licenses is discretionary and the recipient must meet certain requirements, the licenses can not be transferable. However, in spite of clear Congressional language to the contrary, licenses become bound to the station and when the station is sold, the commission rarely challenges the new owner's right to the license. Thus, the value of the license can be capitalized into the value of the station and transferred.[10] To prevent "trafficking" in licenses, the FCC has required new owners to hold their stations for several years before they are free to sell them.

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[9] One of the very few times the commission broke with the tradition, Congress almost passed a bill requiring that the FCC prove licensees derelict before refusing to renew their licenses.

[10] Shepard and Wilcox estimate that one-half the value of a TV station today is the capitalized value of its license. See Shepard and Wilcox (1975), p. 455.

The implementation costs of FCC regulation are high both for the government and for the participants. Although the outcomes may be more or less predictable, legal preparation and a commission hearing attend each license renewal request. Because the stakes are very high (in the millions of dollars), so may be the outlay for preparation if there is the hint of a serious challenge to the renewal. The contest is considerably tougher for new applicants.

Allocation of Rights to Groundwater in California

Although it is a complex case, groundwater management in Southern California is an excellent case for analysis. It highlights the number of potential actors in a regulatory scheme: the courts, the state, and the different categories of water users. It also highlights the variety of regulatory solutions to a common problem.

For a number of decades, groundwater pumping in Southern California has been depleting aquifer reserves, and in coastal areas, has been allowing serious saltwater intrusion. It was in everyone's interest to reduce pumping. The problem lay in equitably apportioning the costs of cutting back and equitably apportioning the pool of groundwater that could be pumped safely. Since the history of use and the problems varied from basin to basin, there was good reason for diversity in water management efforts. Reflecting the underlying differences, groundwater control programs are a patchwork of local arrangements based on some state supreme court rulings and general directives laid down by the State Department of Water Resources.

The legal basis for assigning groundwater rights underwent three distinct changes in this century. Before 1903, a landowner's property

rights entitled him to unlimited pumping from underlying aquifers. In 1903, the California Supreme Court introduced the doctrine of correlative rights. The court recognized that consumption had to be limited, and argued the rights of all current pumpers were "co-related." It, therefore, held that controls should be imposed on that basis but failed to be more specific about how cutbacks should be made.

Almost fifty years later, the court spelled out in detail how the cutbacks should be made, replacing the correlative rights doctrine with the doctrine of mutual prescripton. (Pasadena v. Alhambra, 1949.) Under the doctrine of mutual prescription, the court adjudicated the rights of each user in cases brought before it, on the basis of each user's percentage use over a specified time period. These decreed rights could be leased or sold.

The third change occurred in 1975 when the California courts precluded the continued reliance on mutual prescription as an adjudicatory vehicle for allocating scarce pumping rights. The court's decision in San Fernando v. City of Los Angeles concluded that the rights of public entities could not be impaired by mutual prescription. Thus public entities could not be forced to settle for a pro rata share of a basin's assigned "safe yield".[11] While the San Fernando decision jeopardizes the use of the clearly defined and salable property rights mandated under the doctrine of mutual prescription, it does not set forth any alternative scheme.

As the court defined and redefined the constraints on the allocation of pumping rights, the legislature empowered several

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[11] The decision is explicitly not retroactive. Therefore, existing water management plans based on the doctrine of mutual prescription continue in force. The decision will only affect plans designed for new districts.

districts to levy pump and ad valorem taxes to buy replacement water and to make capital improvements. The authority to tax left basins with the alternative of limiting pumping by taxing overdrafts.

Three types of control programs emerged from the combination of judicial doctrines and taxing powers. The first type emerged directly from the Pasadena decision. Users in a basin negotiate or receive court-assigned pumping rights, allocated on the basis of their use during a base period. The pumping rights are fixed and entitle the holder to pump that same share of any year's permitted yield. The rights are held in perpetuity and are freely salable.

The basin equity assessment program, similar to the oil entitlements program, is a second allocation form. The basin watermaster (a state-appointed administrator) determines what share of total anticipated water consumption can be supplied from basin groundwater. Then each user is entitled to pump that same share of his personal total expected consumption for that year. The watermaster levies a stiff tax on any additional water pumped to pay for the importation of supplemental surface water. Also, most users not using their full share receive payment from the tax fund.[12] Rights are not otherwise transferable. In contrast to the program based on prescriptive rights, the basin equity assessment plan calls for annual revisions in each pumper's share of pumping rights, based on his total current use of water (ground and surface). Therefore, users with a growing demand for water benefit by receiving gratis increases in their pumping rights, and wealth is transferred from the stable user to the growing user. The Orange County Water District bases its management program on the basin equity assessment plan.

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[12] There are a few exceptions but they are not important for our purposes.

A third management form used in California is a hybrid of the first two. Users are categorized and each category is assigned a fixed pool of rights. Users in one category may then receive a fixed share of salable prescriptive rights. Users in another category may have their share of their pool reassessed annually as in the basin equity assessment plan.

In all cases, a state-appointed watermaster administers the program, setting basins' annual safe yield, setting tax rates, buying replenishment stocks, recording transfers of pumping rights, and monitoring pumping. The state and the pumpers share in the support of the watermaster and his office.

California Coastal Commission's Development Rights

The California development rights case is particularly interesting, because it gives "rights" to recipients who, in some instances, are not permitted to use them. Their only value to the recipient is resale.

In 1979, California's Coastal Commission adopted a pilot program to restrict and to redistribute development in the Santa Monica mountains. Development rights were allocated to existing lot owners in the subject areas. Then the Commission established development right requirements for the granting of building permits. Where the object of the program was to reduce density, two "rights" might be required for one residence. If the commission wanted a particular distribution of development, development might be prohibited in some areas, while additional development based on purchased rights was permitted in others.

Development rights were allocated to historic holders--owners of lots zoned for development. They were allocated on the basis of

historic rights, wherever previous development rights were implicit in the zoning. A development right is a complete property right, vested once and in perpetuity, and rights are freely salable through the private market.

Although private market transfers keep state implementation costs low, not many rights have, in fact, been transferred under the program. Some observers believe this is because transaction costs for buyers and sellers are very high. Information on the availability of rights and on price is not readily available. Program designers had hoped real estate brokers would provide the market forum, but so far they have not.

The development rights program is a device to equalize the redistributional consequences of limiting development in an area. Building is limited and therefore the value of developed real estate increases. But because developers must buy development rights from lot owners who forgo development, they in effect share their increased profit. Thus the costs and benefits of controlling development are more equally spread over the whole land-owning group.

Air Pollution Rights, Banking, and Transfer in California

Although the air pollution rights case is not at all mature, it best represents the cutting edge of regulatory program design. It reflects the growing support for economic incentives in regulation. It is a regulatory program to control a health hazard. It grapples with the problems inherent in distributing a limited number of property rights: eligibility, new entrants, exits, transfers, and rules that may change the value of the right. All these issues have proven thorny and have not been clearly resolved.

The Clean Air Act Amendments of 1970 and 1977 mandated the Environmental Protection Agency to establish national ambient air quality standards (NAAQS). Congress included an attainment schedule in the legislation, requiring that areas attain the standards by the late 1980s. In a number of air basins, meeting the statutory deadlines is proving virtually impossible, even with only existing sources. There is no room for new sources--or economic growth. The infant institutional arrangements that allow the vesting of air pollution rights, their banking, and their transfer have evolved over the past several years to provide a mechanism for introducing new sources of pollution to nonattainment areas. Although a number of states and communities are developing such mechanisms, this study focuses on the California program.

In 1979, California passed legislation enabling local air management districts to adopt banking and transfer programs voluntarily, providing those programs were consistent with the provisions specified in the statute. And in March of 1980, the state Air Resources Board recommended a set of policies to guide the local districts in implementing the program. To date only two districts have adopted the program, but several others are considering it.

The legislature authorized any district adopting the program to confer rights on any source owners who reduce their emissions beyond the level already required by law. Thus the enabling legislation makes the broad class of historic producers eligible recipients of rights. In practice, however, local districts have narrowed eligibility. They seem to be thinking only in terms of significant (measurable) stationary

business sources. Mention has been made of somehow making mobile source owners, home owners, and other small source owners eligible. In aggregate, they are major polluters and hard to impose standards upon, and therefore make good candidates for economic incentives. But the notion, when raised, is quickly dropped because of perceived implementation problems.

Moreover, official attitudes toward giving pollution rights to owners closing down plants are decidedly ambivalent. On the one hand, the ARB staff has recommended against crediting exiters with pollution rights on the grounds that a facility does not have a right to pollute. It has only the right to operate. Los Angeles officials have also expressed reservations about crediting exiters who closed plants for "economic reasons." They argue that if an owner shuts down a plant for economic reasons, it would be "unfair" to give him credits. On the other hand, exiters offer the major source of credits for new entrants, absent certification of discrete small sources. This poses a dilemma that officials have not been able to resolve. They seem to share the notion that it is "not fair" to give something to someone who will just "take the money and run."

The legislation orders participating districts to issue certificates to source owners, registering all approved reductions. Once the certificates are "banked," owners have the exclusive right to use them or to authorize their use according to district regulations. Thus, the legislature seems to envisage the pollution right as a property right, probably vested in perpetuity.

In practice, the Air Resources Board and the local districts have again wanted to narrow the legislative definition. Because the program

is new, the districts are not sure what ratio of certified rights to new source emissions to require; that is, should a certificate demonstrating a one ton reduction entitle the new source emitter to produce one ton of new pollution or should districts require new emitters to purchase certificates demonstrating, say, a two ton reduction before they are allowed to produce one ton of pollution? They also are not sure what geographical relationships to require between old and new sources. And they want the flexibility to change any rules if the district fails to meet the NAAQS. In short, the districts have little experience in using offsets and want flexibility to experiment and learn. Yet, the program confers ownership and use rights. Therefore, any rule change that significantly alters the value of a right is likely to impose a serious political problem. Moreover, for firms to bother banking certificates, they must feel reasonably sure the regulatory body will not make rules that seriously devalue their certificates.

In a compromise position, the ARB staff supports a policy whereby the rules in effect at the time of deposit govern certificate use for three years. Then the rules in effect at the time of withdrawal become effective. This rule has been adopted in San Francisco and provided the model for the ARB recommendation. The ARB staff also recommends several other policies that introduce uncertainty into the valuing of certificates. The board proposes to have local districts use banked reductions under certain conditions, to attain standards, with no mention of compensation. It also proposes that local districts prohibit withdrawals if standards are not attained.[13]

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[13] The above are the recommendations of the state ARB. It is most probable that they will be modified as they are used and problems arise. So far, Ventura and San Francisco have adopted rules that basically conform to the ARB recommendations. But their programs are still very young.

If the banking program is to be successful, a market place for pollution rights must evolve. Those who need rights must know who might be selling them and what a reasonable price might be. Interestingly enough, no market appears to be developing. Polluters have no natural ties to a single trade organization that might provide the forum as did, for instance, oil quota users (see below). Unlike the case of development rights, no brokerage institution exists that deals in a similar commodity and might easily broaden its scope to include pollution rights. Instead, most transfers have been brokered at considerable effort and expense, by local governments anxious for new business.

Because the program is still very young, other implementation considerations are not yet apparent. It is also impossible to talk seriously of its evolution. However, even at this early date the tendency to incorporate additional policy objectives into the program design is apparent. The Air Resources Board has recommended that local districts give special consideration to "special groups." Specifically, the board suggests that districts deduct 10 percent of their banked reductions to be used for "good projects." Under "good projects" the board includes agriculture, energy conservation or alternative energy sources, and other "socially or environmentally desirable projects."

PROGRAMS TO MODERATE MARKET SHIFTS

The third category of cases includes six examples, each designed to mitigate the impact of a market shift on a particular economic group. In these programs, benefits are not conferred to restrict externalities or to move publicly owned resources into the private sector for

development. Rather, they are conferred as part of programs to preserve some existing economic status quo.

There are two basic types of programs: those that, in one form or another, prevent the redistribution of wealth from one group to another, and those that distribute losses or gains evenly over the affected group. The cases in our sample that prevent redistribution include two examples of programs favoring producers: the Interstate Commerce Commission's truck operating authority program and the Department of Agriculture's acreage allotment program. The sample also includes two cases that favor final consumers, the oil price control program and the natural gas producer price control program. In principle, programs could also be designed to favor distributors or manufacturing users, but our group of cases did not include any such examples. Two cases also represent programs designed to distribute losses more evenly over an affected segment of an industry: the oil quota entitlements program and the oil price control entitlements program.

Programs favoring producers take the form of a "price floor" for some good or service. But once a program establishes a "price floor," new entrants naturally vie to join old producers in sharing the subsidy offered by the price floor, and either program costs escalate or benefits to the producers are eaten up by the new contracts. Therefore, some mechanism to limit eligibility must accompany programs providing "price floors." The truck operating authorities program limited entry into a market where the ICC set rates above the market level. Similarly, the agricultural acreage allotment program allowed the government to limit its obligation to pay support prices.

Truck Route, Freight, and Rate Regulation

During the early 1930s, trucking competed increasingly successfully with the railroads. Not only was equipment and the road infrastructure improving, but trucking offered a low-overhead, easy entry job opportunity for many of the nation's unemployed.

Responding to pleas from the railroad and from established truckers, Congress enacted the Motor Carrier Act of 1935, mandating the ICC to regulate common and contract carrier truck rates, truck routes, and the freight they could haul. Truckers submitted proposed rate schedules to the ICC, which then approved or disapproved them. This component of the legislation was intended to insure that truck rates did not drop much below already regulated rail rates. The legislation also required that the ICC certify truckers for specific routes and types of freight, thereby limiting competition within the industry. Consumers paid a higher price for trucking services. Provisions of the 1935 legislation remained in force until the late 1970s, when the ICC, first on its own and then with the support of Congress, began relaxing its regulations until they now have little economic impact.

To operate as a common carrier, a trucker or truck firm needed an operating authority entitling him to haul specified commodities over specified routes.[14] With passage of the Motor Carriers Act, the ICC issued 18,000 operating authorities to carriers demonstrably in business, allowing them to continue to serve the routes they were already serving.[15] In sum, the ICC "grandfathered" existing carriers into the program.

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[14] This description is an oversimplification and ignores the slightly different treatment accorded different types of operators and agricultural goods.

[15] MacAvoy and Snow (1977).

Once the original certificates were issued, entry became very difficult. The law required that new operating authorities be granted only if the proposed additional service met the test of "serving the public convenience and necessity." Thus, any applicant had to prove that existing carriers could not adequately serve the public. Consistent with the law, the ICC's dominant concern when deciding whether or not to grant a new operating authority or route deviation was how the change in available service would affect competitive relationships on the route. The commission consistently made its decisions with the objective of preserving the economic status quo. Although it received numerous applications and granted many operating authorities annually, the vast majority were to permit existing carriers to alter their routes or the commodities they could haul in minor ways. In fact, mergers, acquisitions, and alterations reduced the number of operating authorities from the original 18,000 to 15,000, in spite of economic growth.[16]

Operating authorities vested the recipient with a complete property right. He held that right in perpetuity and was free to trade or sell it. In fact, the chief means of entering the carrier business was to purchase operating authorities from owners. The American Trucking Association estimated that transactions in trucking rights totalling about $300 million have taken place since 1935.

The freedom to buy and sell operating authorities has led to an interesting dilemma for those who now want to deregulate the industry.

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[16] MacAvoy and Snow (1977).

Since many firms paid dearly for their certificates, deregulation would impose a clear loss on them by making those certificates worthless. Industry representatives seriously argued to Congress that the government ought to buy up the outstanding operating authorities, thereby compensating those adversely affected by a new government regulatory policy. Congress has declined, supporting deregulation without compensation.

The cost of administering the certification program has been relatively low. Hearings for new applications and route adjustments consume a share of commission staff time, but they are rarely complex or lengthy. Because operating authorities are rights in perpetuity and freely transferable, once the commission distributed them in 1935, they required no more attention. There was no need to reconsider eligibility or the amount of rights to which a recipient might be entitled. There was no public interest test to apply to operating firms or new purchasers. And because a private market evolved, the ICC played no role in facilitating the transfer of operating rights.

Agricultural Acreage Allotments

World War II and the postwar chaos in Europe pushed U.S. farm commodity prices higher than they had ever been, and as more normal times returned, the American farmer feared for his new-found income. Congress, in an effort to maintain farm income, continued a little-used program of price supports adopted during the war. The program maintained a price floor for a list of grain and perishable commodities by offering nonrecourse loans for storable commodities and by directly purchasing processed perishable commodities.[17] Through these loans

[17] Under the provisions of a nonrecourse loan, farmers could borrow money from the Department of Agriculture using their crop as

and purchases, the farmer received a direct subsidy from the taxpayer. Because the government bled off a large fraction of each year's crop to artificially inflate consumer prices, farmers also benefitted at the consumers' expense.

Though Congress did not place strict production constraints on farmers, it did incorporate some supply-limiting provisions into the price support program. The first and most prominent provision was the acreage allotment program. Under that program, each year the Secretary of Agriculture estimated total U.S. grain production requirements. On the basis of that calculation, he determined the acreage that should be planted and divided that acreage among program participants, who then could not plant in excess of their allotment and still be eligible for price supports. But farmers continued to improve their yield per acre, and as surpluses grew, Congress added other programs to reduce production, but all were short-lived and not very successful.[18]

The Department of Agriculture based its allocation of planting rights almost entirely on a farmer's historic acreage commitment to a given crop. The program regulations permitted DOA officials to make some discretionary allocations. But for the most part, the farmer was assigned an acreage share for each supported crop in the program that

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collateral. The crop was valued at the subsidized price. If the market price rose higher than the government floor price, the farmer could sell his crop and repay the government. If it did not, he could keep his "loan" and leave the government with the grain.

[18] As this case amply demonstrates, limiting factors of production can be a poor way to limit production. Acreage allotments proved to be a very weak control on overall agricultural productivity. Farmers simply planted their best acreage, setting aside their least productive. At the same time, they increased their use of technology to obtain higher yields per acre, leading ultimately to abuse of the soil and serious water pollution problems.

equalled his acreage share of the total acreage in production in the United States for that crop during the base period.

To facilitate administration of the program, the small farmer (one who had committed fewer than 15 acres to a supported commodity during the base period) was excluded from the price support program. This rule excluded a large number of farmers, since small farmers produced in the neighborhood of 25 percent of the nation's grain during the 1950s.[19]

After two decades of operation, consumers and taxpayers became increasingly unhappy with the price support program's redistributive consequences. Very large producers received support checks that sometimes exceeded $1 million and became an obvious target for their opposition. After considerable publicity and political pressure, Congress placed a $55,000 limit on any individual producer's annual payment (right to benefit) from a given price support program. That limit was later reduced to $20,000.[20]

A farmer was allocated his share of the national production once and in perpetuity. It was not recalculated annually, and he could do nothing to change his share. Only the number of acres that share represented changed.

Production rights were, in principle, not transferable. They attached to the land. But, the land could be rented. And if the land was sold, the rights went to the new owner. Thus, the value of the production rights was easily capitalized into the value of the land and sold.

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[19] Our discussion of farm policy relies heavily on Cochrane and Ryan (1976).

[20] Cochrane and Ryan (1976).

Like the oil programs, the acreage allotment program required extensive governmental intervention both in the annual assignment of allotments and in the monitoring of the program. Such a program was probably possible only because the Department of Agriculture already had extensive information on farm output, and it had its nationwide system of county agents to monitor the program and arbitrate differences.

Secretaries of Agriculture since Ezra Taft Benson have been eager to modify if not eliminate the agricultural price support program, but farm belt opposition runs very high. Only when worldwide food prices rise well above the support floor for most commodities does deregulation appear to be a possibility.

Programs favoring the consumer often take the form of "price ceilings" placed on goods or services. One characteristic of a price ceiling is that once the ceiling is in force, demand inevitably outstrips supply at the ceiling price, and some means other than price must be used to allocate the price controlled good or service. Thus, the oil price control program went hand in hand with a crude and refined products allocation program. And, as price controls on natural gas inevitably led to shortages, the Federal Power Commission had to establish allocation priorities.

Production Price Control of Natural Gas

The case of natural gas price control is somewhat unusual. While the court ordered the Federal Power Commisssion (FPC) to control the price at which producers sold natural gas and the FPC complied, the commission conferred no rights to purchase. This case provides an interesting example of a government agency creating a shortage by

controlling the price of natural gas, yet refusing for a long time to assume the politically unpleasant responsibility of deciding who should benefit.

National policy regulating the price of natural gas has undergone considerable change over the last 50 years. In 1938 Congress enacted the Natural Gas Act authorizing the FPC to set rates for the transmission and resale of natural gas. In 1954, the Supreme Court ruled in Phillips Petroleum Co. vs. Wisconsin that under the terms of the Act, the FPC should also regulate producer prices of all gas sold in interstate commerce. The FPC struggled with the court's assignment for the next twenty-five years, without developing any satisfactory pricing mechanism.

By the early 1970s, there was a growing shortage of natural gas but no mechanism to allocate available supplies. The low prices set by the FPC discouraged new development and the commitment of new production to interstate sale. At the same time, they stimulated consumption, especially as the price of oil rose sharply. Producer price ceilings, however, prevented the market from allocating the available supplies.

As contracts between producers and suppliers expired and suppliers could find no new gas, they were forced to make the allocative choices. Not surprisingly, their existing customers enjoyed allocative priority. Not only did suppliers continue to serve existing customers, but they continued to deliver whatever quantities the customer wanted if they could. As supplies dwindled, suppliers denied hook-ups to new applicants, who then had to import expensive liquid gas or relocate in gas-producing states to gain access to unregulated intrastate supplies. In severe cases, suppliers had to inform long-term customers that their

contracts could not be honored, and these customers, mainly utilities and heavy-using industries, generally then switched to alternative energy sources.

As shortages became very acute, the FPC drew up a priority ranking of users. FPC Order 467B, issued in 1973, gave priority to residential and small commercial users, then to large manufacturing and feedstock users, then to other industrial users, and finally to a variety of boiler and interruptible users. Suppliers allocated new hook-ups according to the priority list when supplies became available. But old customers were not disconnected to make room for new customers even if the newcomers enjoyed a higher rank on the list.

In 1978 Congress passed the Natural Gas Policy Act. The act gradually deregulates new gas production (about 60 percent of total) while still controlling old fields to prevent windfall gains to producers and requires that most gas sold in inter- and in intrastate commerce be similarly priced. In the act, Congress also affirmed the FPC's priority list with only minor changes, suggesting it reflected political realities.

Petroleum Price Control and Allocation [21]

The oil price control and allocation program provides an interesting contrast to the natural gas case. In this instance, the job of price control was not forced upon a reluctant bureaucracy by the courts. Instead, the Cost of Living Council and later the Federal Energy Administration (FEA) under Congressional mandat· undertook the responsibility quite eagerly. Likewise, both Congress and the FEA

[21] The entitlements program, an integral part of the oil price control and allocation scheme, will be discussed in a subsequent section.

quickly took responsibility for assigning user priorities when shortages developed.

The program, a gargantuan regulatory effort by any standard, grew almost by accident out of President Nixon's price control program. In the inflationary environment of the early 1970s, the federal government had turned its attention to protecting the consumer. After heating oil shortages led to especially sharp price rises during the winter of 1973, the Cost of Living Council imposed mandatory price controls. Unlike its predecessor the quota program (see below), designed to prevent the producer from being hurt by a condition of oversupply, the Cost of Living Council price control program prevented the consumer from being hurt by a shortage. Later that year, OAPEC placed an embargo on oil shipments to the west, creating an even more acute shortage. Under growing political pressure, Congress enacted the Emergency Petroleum Allocation Act of 1973 (EPAA). EPAA provided a statutory base for the existing price control program and set forth a host of allocation objectives that were to guide the executive branch in distributing existing oil supplies.

Congress saw several reasons for not allowing the market to allocate a scarce resource. First, it was no more willing than the Cost of Living Council to let domestic producers take windfall gains. Second the OPEC-induced shortage occurred suddenly, leaving consumers little time to adjust. Congress thought that both the inflationary impact and the structural impact of free market allocation would be too disruptive for the economy to sustain. In the face of the shortfall then, Congress had to create a legislative package to control prices, thereby preventing redistribution of wealth from the consumer to domestic

producers, and to allocate short supplies in the absence of an allocative market mechanism.

The price control program launched by the Cost of Living Council and formalized by Congress was of necessity extremely complex. It controlled the price of all domestic crude oil from wells that were in production before 1973. Program supporters argued that those wells were developed using profit calculations based on old prices. Any price increase would, therefore, return a windfall to the producer. Price control thus led to a two-tiered pricing system, controlled (old) oil and uncontrolled (new and imported) oil. To insure that the consumer ultimately benefitted from the price control program, the legislation had to provide for price controls all the way down the market chain to the retail level and for an allocation program to prevent discriminatory distribution of petroleum products. And, unlike the direct market links--producer to pipeline to distributor to end user--that characterize the natural gas market, the petroleum products market is labyrinthine.

The allocative provisions of the 1973 legislation stemmed from existing government regulations. In April of 1973, Congress had given the president discretionary allocative authority under the Economic Stabilization Act. On the basis of this authority, President Nixon announced voluntary guidelines to guarantee that supplies would not be diverted from independent retailers and other product purchasers to major oil company retailers. The voluntary guidelines urged suppliers to provide clients with a share of available product equal to their 1972 share. The voluntary guidelines were largely ignored, and the president imposed a mandatory program for a select set of products including home heating oil.

Congress required the mandatory program be extended and articulated several principles, some conflicting, that should guide the design of the more broad-reaching allocation scheme. The act directed the president to provide users with supplies that at least equalled their 1972 purchases. If supplies did not permit this, then across-the-board proportional reductions were to be made. The president was also directed to make equitable adjustments to account for increases in supply for new entrants. At the same time, Congress also drafted "guidelines for the priority allocation of fuel." The guidelines contained a laundry-list of users and objectives Congress thought should receive priority. They included residential heating, the operation of refineries at full capacity (protecting small refiners), maintenance of public services, agricultural operations, competition, equity, and allocations to aid the development of new energy resources.

By 1975 when EPAA was due to expire, OPEC had lifted its embargo but raised its prices dramatically. In spite of their original intentions and strong presidential opposition to the continuation of controls, Congressional Democrats could not accept the consequences of decontrol. They feared disruptive macroeconomic effects, negative consumer reactions, and negative political consequences from highly visible windfall gains accruing to domestic producers. Instead of allowing the program to expire, they continued it as the Energy Policy and Conservaton Act of 1975, provided for ultimate decontrol in the early 1980s, and mandated a set of conservation measures to substitute for price as a means of controlling demand.

As price controls approached their expiration date and it became clear there was insufficient support to extend them, Congress passed the Windfall Profits Tax Act of 1980 to capture the rents that would accrue to oil producers when prices rose. It is the largest single tax yet levied on U.S. industry, with revenues expected to exceed $225 billion over the next 10 years. Proceeds were originally to be earmarked for energy-related programs, but in its final form, the bill sends them to the general fund.

Although EPAA and EPCA provided some general guidelines, FEA formulated and administered the allocation program, and several principles seemed to govern its design. If supplies permitted, new users could get allocations. However, if supplies were tight, historic users received allocations equal to their purchases during the 1972 base period--their historic use. And finally, an acute shortfall prompted FEA to allocate to priority users--those judged to be "best users" according to some criteria of social benefit and need--according to their need.

To guarantee historic users their allocations, FEA froze supplier-purchaser relations as of 1973 for crude oil and as of 1972 for refined products. It argued such a step was necessary to maintain the existing distribution network, to protect the independent sector, and to assign end-use allocation priorities. Although the rules permitted the purchaser to shop around, competition was in fact discouraged, because suppliers always had to be ready to meet their base-period commitments.

During periods of shortage, FEA assigned allocative priority first to defense and agriculture. These sectors were to receive 100 percent

of estimated current needs. Second priority users were to receive a fraction of their requests and third priority users received a fraction of their base period volume. Refiners could sell surplus product, offering it first to independent retailers.

Priorities and shares changed over the years. For instance, rarely did a sector get 100 percent of its current requirement. Agriculture once did. But during the 1979 fuel shortage, farmers were selling their allocations on the black market while truckers, short of fuel, were blocking the nation's highways in protest. The policy was amended.

FEA continued to use the exceptions process used by the Cost of Living Council. The exceptions procedure allowed any firm to petition for a price increase or exemption from FEA rules on grounds of inequity or hardship. Congress never defined inequity and few appeals on this basis have been successful. Hardship appeals, on the other hand, have been frequent and generally successful when the viability of the firm seems clearly threatened by regulatory decisions. Exceptions seem intended to maintain an approximation of a firm's historic profitability and historic returns to capital rather than to approximate the workings of a dynamic marketplace. Exceptions have also been granted to further other national policies. For example, gasohol manufacturers were granted favorable treatment under the program.

FEA's management of the price control and allocations programs is undoubtedly one of the most costly peacetime regulatory exercises the United States has undertaken. While accurate cost estimates are difficult to make, one study suggests FEA employed over 2,000 people and spent in the neighborhood of $50 million per year managing the programs.[22] Another study done by the General Accounting Office

[22] Montgomery (1977), p. 165.

estimated that industry spent about 8 million man-hours per year meeting FEA requirements, a burden second only to that imposed by the FCC on the broadcast industry.[23]

The program has been extremely costly to administer, because it is so complex. It is complex for several reasons. First, the legislation espouses multiple and sometimes conflicting purposes. These include the equitable allocation of a scarce resource, the capture of economic rents for the consumer, and the maintenance of the petroleum industry's existing structure. (See the discussion of entitlements program below.) Second, the industry itself is exceptionally complex, with multiple product types, business roles, and relationships between levels in the distribution chain. Third, allocating crude and refinery costs across a diverse product line is virtually impossible, yet the program requires it. And fourth, while the regulated environment is dynamic, the regulatory format provided few automatic adjustment mechanisms. Consequently, most adjustments have to be made on a discretionary basis, often in accordance with the formalities of due process.

The dominant evolutionary characteristic of this regulatory program is also complexity. The program was complex at its inception and grew increasingly complex over time. Both the rulemaking and exceptions processes continued to add new wrinkles throughout its existence. EPCA added a second tier of price controlled oil, and the entitlements program then had to be amended to reflect the fact that there were three types of domestic oil plus imports (see below). An increasingly complex package of incentives evolved to encourage the production of new oil.

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[23] Montgomery (1977), p. 165.

In short, the longer discretionary decisionmaking was substituted for the market, the more complex the regulatory package became. Second, the bias toward small refiners and retailers increased over time, reflecting government's fundamental interest in protecting small business. Third, it is worth noting the difficulty Congress had in giving up the price control objective of the regulatory package, once it had been introduced. As the gap between the controlled price and the market price widened, the political implications of decontrol became more threatening.

There are times when either government intervention or changing market conditions unevenly affect some group within an industry. Especially in instances created by government intervention, the losers press hard for a program to even out the effects. Policymakers tend to be quite responsive in such situations, feeling keenly responsible for the unintended side-effects of any government policies or programs. In this type of case, any government intervention will reflect an effort to compensate some segment of an industry for dislocation in a way that will return the industrial participants to a prior competitive status quo.

The oil quota and oil entitlements programs in our case study population represent two examples of such programs. In both cases, government regulations created multiple prices for the same commodity and users had uneven access to the cheaper supply. Some users, then, stood at a severe competitive disadvantage as they sold their products.

Oil Import Quota Program

The oil import quota program contained a classic example of a subsidiary program developed to redress a market balance upset by an umbrella program.

During the mid-1950s, the price of foreign oil fell relative to the price of domestic crude. At that time, many oil-producing states prorationed (restricted) internal production to maintain the price of crude. As imports increased, states required domestic producers to further reduce production, limiting their market shares and profits. Many domestic producers threatened to go under. In 1957, the Department of Interior imposed a voluntary quota on importers of foreign crude, but imports continued to rise.

In 1959, President Eisenhower imposed a mandatory quota on the importation of foreign crude and refined products under the authority of existing national security legislation. The quantity of allowable imports was set as a percentage of total product use and fluctuated from year to year. It was, at first, pegged at 9 percent, the 1957 level and the status quo. Several years later it was raised to 12.2 percent to reflect the reality that program participants, both government and private, had devised ways to increase imports. The mandatory program, with some modifications, governed imports until it was finally abandoned during a period of oil shortage in 1973.

At the same time it prevented a wealth transfer from the producer to the consumer, a simple oil import quota would also have improved the competitive position of some refiners at the expense of others. Since foreign products were cheaper but in limited supply, the program would

lead to a two-tier pricing system, and those importers or refiners able to buy the cheap imports would reap substantial windfall gains. The DOI, as manager of the quota program, did not want the program to cause any major shifts in the structure of the industry and therefore sought a way to allow equitable access to the scarce resource--cheap imports. The device adopted by DOI was the quota right, the right to import or use the cheaper imports.

DOI favored two possible recipients for their quota rights. Under the voluntary program, importers had received quota rights. But because importers then became the gainers (they could buy at low overseas prices and sell at high U.S. prices), new entrants flocked to the import business.[24] Under the mandatory program, the president ordered the Secretary of Interior to allocate imports "fairly and equitably" among refiners according to their prior use. Eligibility was thus limited to any refiners (old or new) with demonstrable capacity and output in a previous period. Importers continued to receive quota rights for residual fuels and refined products under the mandatory program.

DOI argued that allocating quota rights to all refiners rather than just to users of foreign oil was both equitable and efficient. It distributed them "more broadly." And if only historic users of foreign oil (Atlantic Seaboard refiners) received rights, the subsidy would allow them to drop prices and penetrate natural markets of the inland refiners.[25] However, to cushion the Atlantic coast refiner who had based his investment decisions on the expectation of available and cheaper imports, DOI set aside 80 percent of the total quota for

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[24] Our discussion of the oil import quota program relies heavily on Bohi and Russell (1978), p. 67.

[25] Bohi and Russell (1978), p. 71.

allocation to historic users and only 20 percent for allocation to inland refiners. This asymmetry was intended to be temporary, although almost a decade passed before it was substantially altered.[26]

Three criteria determined the share of quota rights a recipient received. The share was based either on historic allocations under the voluntary program or on a refiner's total refinery run, whichever was largest. Allocations based on refinery runs were made according to a sliding scale favoring the small refiner. Allocations to importers of residual and refined products were based solely on historic use in 1957.

DOI adopted the sliding scale scheme favoring small refiners to forestall Congressional intervention that threatened not only to favor small refiners, but also to freeze the outlines of the program in legislation. The refining sector, not surprisingly, soon learned to exploit the small business bias by dividing corporate entities to increase allocations. Also, informal rather than formal mergers became common.[27]

In principle, quota rights could not be transferred. Only oil could be traded. To work an exchange, oil had to be imported to the account of an inland quota holder, then shipped to an Atlantic refiner. The Atlantic refiner, in turn, ordered domestic crude in his name for shipment to an inland refiner. Exchanges had to be in similar kinds of crude, delivered within 90 days of one another, and reported to DOI's Oil Import Administration. But the department had no good way to monitor or enforce the prohibition of cash transfers and ultimately relaxed the rules to reflect reality.

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[26] Bohi and Russell (1978), p. 11.
[27] Bohi and Russell (1978), p. 114.

DOI avoided cash exchanges, although admittedly they were more efficient, because cash exchanges would highlight the cost of the program to consumers and might mobilize them in opposition.[28] DOI's complex, cashless transfer requirements appear to have been feasible only because the oil industry already had well developed mechanisms for transferring oil and rights to oil and because trade journals reported exchanges and "prices," leading to a stable market.

The administrative costs of the quota program were probably in the moderate range. To set the next period's import quota, DOI estimated future consumption every six months. It then estimated each refinery's share according to the formula. The department also had to monitor the complex transfer process. In addition, DOI funded and managed the Oil Imports Appeal Board to grant relief in cases of hardship or error.

In practice, the import quota program proved very hard to administer. Producers complained of bad management and rampant exceptions. Consumers increasingly pressed for the relaxation of the quota provisions. In 1969, because the program was in such disarray, DOI proposed auctioning quota rights as a way of circumventing allocation, management, and enforcement problems. While all agreed the program did not work, 100 of the 101 interest groups that registered a position opposed the auction. The opposition argued that shifting to an auction system would penalize those who had accommodated to the present system.[29] Provisions of the oil import quota program governed access to cheaper foreign petroleum for 14 years.

[28 Bohi and Russell (1978).
[29] Bohi and Russell (1978), p. 136.

Over the life of the program, there was a constant tendency to broaden program objectives. In addition to protecting domestic producers, cushioning the impact of the program on East Coast refiners, and subsidizing small refiners, Congress and the executive branch modified the program at various times to benefit other segments of the industry, to promote economic development in U.S. possessions and territories, to further hemisphere relations, to achieve air quality goals, and to aid certain consumer groups.

By contrast, participants successfully fought changes that would cause redistributions among themselves. For instance, the preference initially given to historic users on a temporary basis was not modified for 10 years. It took petrochemical manufacturers years to persuade DOI to assign them quotas, since they, like refiners, used crude oil feedstocks. Not surprisingly, anything that broadened eligibility was staunchly opposed by all quota holders.

By the turn of the decade, DOI began easing restrictions and increasing the import quota as oil supplies grew increasingly short and consumers increasingly resistant to price rises. In 1973, the program was abandoned.

Oil Entitlements Program

The oil entitlements program is simply the mirror image of the quota program. But because it was so large and controversial, it deserves some attention.

The entitlements program grew out of the 1973 effort to control the price of domestic crude oil, an effort described in detail above. As we noted, the oil price control program created a two-tiered pricing system

that mirrored that of the oil quota program. There was a limited supply of price controlled "old" oil that refiners then supplemented with more expensive "new" or imported oil. Refiners enjoying access to the cheaper "old" oil stood to benefit greatly.[30]

However, FEA, like DOI before it, believed that a two-tiered price system should not be permitted to emerge and that refiners should be given equal access to the benefits of price control. To this end, FEA established a cost equalization plan, giving each refiner a share of entitlements to refine cheaper domestic crude. The refiner then "spent" one entitlement for each barrel of "old oil" he refined.

FEA distributed entitlements to refine cheaper domestic crude, as had been done under the quota program, to all refiners with a demonstrated output capacity. A refiner's share of entitlements was based on his present (actual) use of crude. Each refiner received entitlements to cover the share of his total input that was equal to the share of total crude refined that was "old oil." FEA computed new entitlement allocations each month.

FEA granted small refiners preferential treatment, as they had been granted under the quota program. Those refining less than 100,000 barrels per day were phased in slowly and therefore did not need to buy entitlements at first. Refiners using less than 175,000 barrels per day paid less than one entitlement per barrel of old oil used. As the program evolved, advantages given the small refiners grew until many were entirely exempt from the provisions of the program. This meant

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[30] Either they could raise their product prices, or, if price control made that impossible, they could sell their products more cheaply, presumably improving their market position. Also, in the latter case, refined products would then have two-tier pricing and the effects of the split pricing would ripple out through the economy.

that while the small refiners were not given extra entitlements, the small inland refiners with access to "old" oil could refine it without first buying entitlements from a refinery dependent on imports.[31]

The right that an entitlement conferred upon a recipient was limited. It was not a permanent property right. The number of entitlements a refiner might receive would vary according to his use and according to the availability of "old oil." And every month FEA recalculated refiners' shares and reassigned entitlements, thereby sharply limiting the duration of a recipient's right. Because the lifetime of an entitlement was so short, it had no long-term speculative value.

In contrast to the oil quota program, entitlements were freely salable. Cash transfers in this case reflected consumer savings rather than producer subsidies, apparently making their visibility politically acceptable. Salability also meant that entitlements could serve as a cash subsidy for any group FEA and later the Department of Energy chose to favor. And over the years, many happy recipients, only very tangentially related to oil, benefitted from that fact.

The implementation and evolutionary characteristics of the entitlements program are very much intertwined with those of its umbrella price control program. We, therefore, discussed them above in the context of that program.

The above discussion presents only the barest outline of cases that are, in most instances, very complex, and we have completely ignored major aspects of several programs. But we have included the basic design elements of each program that pertain to the conferring of

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[31] Montgomery (1977), p. 37.

property rights: Who receives them, on what basis, and what rights does the recipient get. We have also noted in passing any obvious implementation and evolutionary characteristics. It remains, then, to search these data for patterns that might suggest the political considerations underlying the design choices and program outcomes.

III. DESIGN, IMPLEMENTATION, AND EVOLUTIONARY THEMES

In this section we explore the design and implementation patterns within and across types of programs. Our exploration focuses on the following questions. Who receives rights and what do they receive? On what basis is the allocation made? We also consider the scale of implementation costs that seem to be acceptable, the kinds of implementation problems various types of programs have encountered, and how kinds of programs seem to evolve.

As we discussed in Sec. II, all programs where the government allocates rights to particular groups seem to fall into one of three categories. First, there are the instances where the government has laid claim to unpossessed property, the property most often being land, and later wants to pass it to the private sector for development. Second, there are the instances where present use patterns create externalities either for the user group or for the public, and the government is called upon to regulate that use. Third, rights are conferred upon a particular group to protect its members from growing market pressures.

This typology proves very useful in understanding program design choices. The different situation represented by each type of case determines the recipients of the right and often the basis for distributing the rights. Who receives the rights and on what basis often then dictates the nature of the right and program implementation characteristics. Even where choice of recipients does not impose specific secondary design and implementation choices, political

requirements sometimes seem to dictate certain choices depending on the type of program.

Table 3 summarizes the chief characteristics of the cases we examined. As the table clearly shows, different allocative patterns obtain for each type of case. When the government distributes the right to exploit a publicly owned resource, recipients vary as does the basis for the allocation. When the government allocates rights to reduce an externality, it distributes the right, without exception, to historic users and bases the allocation on historic use. In market shift cases when the producer is protected with a price floor, he receives the allocation based on historic production. When a program protects consumers with a price ceiling and must allocate resources made scarce by price control, multiple criteria determine who receives the allocation and on what basis he receives it. And finally, when rights are allocated as a means of reducing the side-effects of an umbrella regulatory program, they are allocated to actual users and on the basis of the user's current consumption.

In many cases, property right characteristics seem to be determined by allocation characteristics. In all cases where rights are allocated to best users, they are not supposed to be transferred. In almost all others cases they are transferable either through direct sale or sale of the real property to which they attach. Table 3 does not, however, suggest any relationship between allocative criteria and whether a right is salable or not.

There is a similar relationship between the allocative criteria and the term of the allocated right. Rights that are allocated on the basis of actual use are short term. Those that are not divide between a long-term right and a right in perpetuity.

Table 3

PATTERNS OF PROGRAM DESIGN AND COST

Program	Recipient	Basis for Allocation	Transferability of Right	Duration of Right
PROGRAMS TO DEVELOP PUBLIC RESOURCES				
U.S. off-shore leases	Highest bidder	Bid	Salable	Long term
U.K. off-shore leases	Best user	Social benefit	Shares salable[a]	Long term
PROGRAMS TO CONTROL EXTERNALITIES				
Allocation of broadcast spectra	Historic user[a]	Historic use	Transferable with sale of station[a]	Perpetuity[a,b]
California groundwater management	Historic user	Historic use	Salable and transferable	Perpetuity
California Coastal Commission development rights	Historic user	Historic holding	Salable	Perpetuity
Air pollution rights	Historic user	Historic use	Salable	Long term?
PROGRAMS TO MODERATE MARKET SHIFTS				
Truck operating authorities	Historic producer	Historic production	Salable	Perpetuity
Acreage allotments	Historic producer	Historic production	Transferable with real property	Perpetuity
Oil price control	Actual, historic, and best users	Historic and actual use, need	Not transferable	NA
Natural gas producer price control	Actual, historic, and best users	Historic and actual use, need	Not transferable	NA
Oil quota program	Actual user	Actual use	Salable[a]	Short term
Oil entitlements	Actual user	Actual use	Salable	Short term

[a]These entries reflect de facto results although the law provides for best-user and best use allocation and non-transferability.

[b]Perpetuity should be read "for all the life of the program." As the truck operating authority case demonstrates, Congress can and will terminate programs without compensation to right-holders.

NA=Not applicable

Administrative costs may be expected to relate to two program characteristics. When rights are allocated to best users and when a program undertakes price control, administrative costs may be expected to run high. They should be lowest when rights are allocated to highest bidders and when they are allocated in perpetuity and salable. They should fall into the middle range when recipients are fixed but shares must be recalculated frequently. And costs in this last instance should vary greatly, depending upon the availability of necessary data.

We examine these interrelationships in more detail below. We also explore what these primary design characteristics may imply for other program characteristics such as freedom of entry and overall complexity of administration.

CHARACTERISTICS OF PROGRAMS THAT DISTRIBUTE THE RIGHT TO DEVELOP SCARCE PUBLIC RESOURCES

When the government decides it is time to exploit some resource located on public land, it starts with an essentially clean slate. Heretofore the government has been the sole owner and user of the land. No member of the private sector has any history of investment or use. There are no historic users. In the absence of any historic claim for allocative priority, the government must decide on some other criteria to determine who receives exploitation rights.

The government's alternatives are several. It could auction or sell the rights either to developers or to investors, who would in turn sell them to developers. It could give them to developers or investors according to some equitable procedure like a lottery. Or it could give them to developers or investors who contract to perform in a way that

would further some government policy objective. These recipients would qualify on the basis of being best users. The allocation of rights to exploit gas and oil reserves on off-shore lands claimed by the U.S. government is an example of the auction method of distribution. The allocation in the United Kingdom of development rights to British firms who proposed the fastest development, and the allocation of broadcast licenses to new licenses are examples of distribution to best users. And though our sample included no cases where rights are allocated by lottery, the U.S. government now allocates a substantial fraction of its on-shore oil and gas leases through a lottery open to any U.S. citizen. Lottery winners then sell their leases to developers. In short, there are many options for allocating exploitation rights open to governments, and they seem to be using them all.

Although the three allocation alternatives differ considerably along many dimensions, they have one thing very much in common. Governments seem universally anxious that a price be extracted from the developers. Auctions and lotteries both insure the market will extract a fair price from the developer, although in one instance he pays the government and in the other he pays the winner of the lottery. When rights are allocated on a discretionary basis, there is the possibility of extracting a "high" or a "low" price depending on the administration of the program. But in the U.K. off-shore leasing program, officials appeared quite eager to extract what they thought could be got from the developers, first in speed of development and later in consumer price reductions and joint government ownership.[1] To be sure, they were

[1] This is not to judge the real value of the "price" a government making discretionary allocations may extract. Many agreed that the U.K.'s measure of fast development (holes drilled) was not only inappropriate but counterproductive.

especially eager when their one experiment with an auction more clearly defined the value of the leases and that value became more widely known.

While governments may want to extract rents from developers, there appears to be no consensus on exactly who should benefit from the extracted rents. When leases are auctioned, the revenues go into the general fund and the taxpayer benefits. In the United Kingdom, criteria for discretionary allocation were supposed to result in broad-based benefits to citizens and to the large group of consumers who used natural gas and petroleum products. In the case of lotteries, only eligibility is broad-based. Those who lay claim to the rents are a small group of lucky winners. These examples suggest that policymakers must be concerned with an equitable distribution of the returns, but they also suggest that "equitable" includes both actual broad-based distribution of benefits and broad-based access to a "fair" process of distribution.

The term of the property right conferred is virtually the same in all cases. Uniformly, governments seem to allocate long-term leases when the goal is to expedite development. In the United Kingdom, the criteria for allocation guaranteed development. The typical term of a U.S. off-shore lease is five years, with provisions of renewal, barely long enough to complete the exploration process. The shortage of time prevents the purchaser from holding the lease purely for investment purposes. In no case does the government give up title to the land.

Transferability of the lease, not surprisingly, depends upon the method used to allocate it. If the developer purchases the lease in an auction or it is awarded by lottery, it is salable. In the United

Kingdom, however, where the lease is awarded on a discretionary basis, the rules prohibit its transfer. Discretionary allocation policies, in fact, require rules preventing transfer if the government is to assure itself that the holder of the lease will conform to the best use standards. Also, when leases are awarded to best users, it would be politically embarrassing to have them resell the lease at a substantial profit and thereby prove that the government had not extracted a reasonable "price."

Although lease-holders may not be allowed to sell or transfer their leases, it proves very difficult to stop them. In the case of U.K. off-shore leases, lease-holders learned to capitalize the value of the lease in shares they hold to newcomers in their development consortia.[2]

The three allocation alternatives impose substantially different administrative costs. When leases are auctioned, the government must identify the tracts, set forth the standard conditions of the lease, and organize and conduct the auction. The process requires no further supervision until the lease comes up for renewal, and the terms for renewal are reasonably standard. In the case of allocation by lottery, the government's job remains identical, except it must run a lottery instead of an auction. But at this point the lottery system imposes the additional costs on the economy of transferring the leases from winners to developers.[3] These costs are borne by the winner and not the government. And finally, discretionary allocation requires substantially more administrative oversight. Allocation criteria must

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[2] Dam (1976).

[3] Transfer is handled by the private sector. A number of firms have sprung up to coordinate entry into the lottery and to transfer the leases for winners--all for a fee.

be decided upon. Development or use plans must be reviewed and negotiated. And actual development or use must be constantly monitored. Discretionary allocation requires "hands-on" administration.

In summary, when the government allocates rights as a vehicle for getting development or use of publicly owned, scarce resources, it does so in a unique regulatory context. There are no historic users or owners. With no historic users, governments show great flexibility in the type of allocative criteria they adopt. Their chief concerns appear to be guaranteeing that appropriate rents are extracted from developers and that the rents are "equitably" distributed. And again the term "equitable" is broadly defined to include broad-based access to the process of distributing rents as well as broad-based receipt of rents or benefits.

CHARACTERISTICS OF PROGRAMS THAT CONTROL EXTERNALITIES

In programs that fall into this category, the government (any of the three branches) is called upon to allocate user rights as a means of limiting a production or consumption activity that imposes undue costs either on the user group itself or the community at large. In the cases of spectrum allocation and groundwater management, overuse jeopardized the value of the resource for its users. They turned to the government to equitably limit use among themselves. In the development and air pollution rights programs, the community at large, also the users of open space and clean air, called for restrictions on the production of the externality (development and air pollution, respectively).

These cases have two important characteristics in common. First, the resource that is being preserved is a quasi-public or communal good. Before the introduction of regulation, air waves, groundwater, open-space, and air were all communal and not privately held resources. Conceivably, if the government had foreseen a future shortage of the resource, it might have laid claim to it in "the beginning," before any users had made investments and come to enjoy benefits that depended on free access to the communal good. It did so in the case of the public lands. Second, in all these cases, users do currently enjoy the benefits of the communal resource. Moreover these users have made substantial investments on the assumption that the resources in question would be freely available to them.

These two attributes of cases where regulatory programs control externalities seem to suggest something of a contradiction. A public or communal resource is at stake, yet the semblance of private ownership obtains. Is the government simply to allocate complete property rights to a small group while stripping the rest of their limited communal rights? Or is it to take the resource from its present users and redistribute it? Or is it to first take away and then sell back the resource to its present user?

Although the contradiction may exist in the abstract and, in fact, pervades the stated objectives and design of at least one of our cases, the judicial, the legislative, and the executive branches have uniformly supported the claims of historic users when allocating rights. In all four cases, rights have been allocated to historic users and the allocations have been based on historic use. In the cases of broadcast

licenses and pumping rights, they were distributed among existing broadcasters and pumpers and on the basis of historic use. Development rights were allocated to those who held appropriately zoned parcels of land on the basis of the development that the zoning would permit--a historic owner on the basis of his historic rights. And finally in the air pollution case, the polluter, after complying with all the mandatory regulatory standards, is, in effect, granted pollution rights for all the remaining pollution he produces--again the historic user of the air on the basis of historic use.

Although the government is uniform in its practice of allocating to historic users, there is ample evidence it is ambivalent in so doing. The allocation of broadcast licenses perhaps represents the best example of such a case. Congress declared the air waves to be public property and ordered first the Federal Radio Commission and then the Federal Communications Commission to distribute them on a best use basis to a limited number of broadcasters who would serve the public.

But in spite of their mandate to lay claim to the air waves and "sell" them to prospective users for promises of good broadcasting, the commissions did not. Instead, they canceled the licenses of only a few existing stations and made every effort to reduce broadcast interference by reducing broadcast wattage and by forcing overlapping stations to time-share. In short, the commissions allocated rights to historic users and, to the degree possible, on the basis of historic use. They also did their best to distribute the costs of regulation as evenly as possible across the industry.

It is worth noting that once Congress did appropriate the radio spectrum, the allocation of additional licenses could conform to the

best user model. Thus, as technology permitted stations to be added without increasing interference, the applicants competed on the basis of providing competition and of serving community needs as those for U.K. off-shore leases competed on the basis of timely development.

The allocative objective in all cases was not to capture the developer's rents as it had been in the earlier cases. Rather it was to reduce exploitation of the resource, and at the same time to distribute the costs of that reduction among the users in a way that maintained their existing structural relationships. Thus, no price was ever exacted for rights allocated in these programs and no obvious effort was made to transfer wealth from one group to another. And once rights were allocated and their owners were in a position to capture rents based on the new scarcity of the resource, rarely would a program attempt to divert those rents to the government or force them to be passed on to the consumer.[4]

Because the ceiling on the production of the externality is intended to be permanent, all programs allow the transfer of rights to accommodate new entry into the industry. The very purpose of both the development rights and the air pollution rights programs is to provide a mechanism for aggregating rights. So both these programs allow the freest form of transferability, sale. Groundwater rights are also generally salable

Only in the case of broadcast rights is there an apparent effort to hinder transfer of the right. Since, according to the rules, the FCC should allocate broadcast rights on a best user basis, these rules also

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[4] The FCC does attempt to recapture licensee rents through its public interest requirements for public service programming, local programming, etc.

provide that new holders of licenses must likewise be screened. Thus in principle, the buyer of a station should be evaluated as any new entrant would be. But in fact, the FCC very rarely strips a new owner of the license that came with his station. Licenses are readily passed with the station from new owner to new owner, with the value of the license capitalized in the sale price.

In externality cases, regulatory bodies tend to allocate rights that are valid in perpetuity. While there has been some discussion of making air pollution rights good only for a "long term," there has been no suggestion of how a program could be structured to limit an owner's term of ownership, and currently rights are held in perpetuity. Similarly, although broadcast licenses expire after a limited term, they are virtually always renewed.

CHARACTERISTICS OF PROGRAMS TO MODERATE CHANGING MARKET CONDITIONS

Programs falling under this final category have been adopted by Congress or the executive branch to forestall losses threatening particular groups when market conditions change. Rights are conferred as a means of preserving an economic status quo. They benefit potential losers.

Producer Protection Programs

As we discussed in Sec. II, programs designed to forestall producer losses often take the form of a "price floor" for some good or service, and some mechanism to limit eligibility must accompany programs providing "price floors." The truck operating authorities program limited entry into a market where the ICC set rates above the market level, presumably guaranteeing a higher income to those allowed to

provide the service. Similarly, the agricultural acreage allotment program allowed the government to limit its obligation to pay support prices.

If eligibility is to be limited, access or rights to the subsidy must be allocated. And again allocations appear to be made to historic producers. The ICC granted operating authorities to truckers and to firms in business when the legislation was passed. Similarly, the Department of Agriculture ruled that only those farmers producing the supported crops during a base period preceding the start of the program should receive the acreage allotments that, in turn, entitled them to price supports.

The political process' preference for historic producers in this type of case should not be surprising. The group being protected, after all, had sufficient political muscle to get the subsidy in the first place. They should also be strong enough to see that it is not lost as new entrants move in.

Programs benefiting producers not only allocate rights to historic producers, but they appear to do so entirely on the basis of the producer's historic production share. Eligible truckers received permits authorizing them to continue serving their historic routes and customers. Since the purpose of acreage allotments was to reduce the production of subsidized crops, the Department of Agriculture limited the total acreage for each crop to less than 100 percent of that in the base period. But the department based the allocation of allotments to each farmer on his historic production share during the base period.

Since programs granting production subsidies are designed to limit access to the subsidy they limit new entry. The Motor Carrier Act of

1935 authorized the ICC to issue additional operating authorities to new truckers if their applications met a "public convenience and necessity" test. In practice, the ICC issued few additional operating authorities. In the farm subsidy program, no new producers and no new acreage were eligible to receive an allotment.

In both cases, the group of eligibles could not be expanded and new entrants had to buy access to the price floor from existing right-holders. Operating authorities were freely salable and regularly sold in the private market. Acreage allotments could not be separated from the land to which they attached. That is, no producer could keep his land but sell the right to plant his allotted acreage to his neighbor. To acquire the allotment, the neighbor had to buy or rent the land. Such transfers were often made, and the value of the allotment was capitalized into the land value.

The producers' right to the price floor appeared to be valid for the duration of the program. There are no examples of programs issuing short-term rights of access. Such a design would be more cumbersome administratively. It would also repeatedly raise the issue of eligibility. If only last year's producers are eligible, why withdraw and reissue permits? If others are eligible, who should they be?

Consumer Protection Programs

Programs benefiting consumers often take the form of "price ceilings" placed on some good or service. However, once the ceiling is in force, the demand inevitably outstrips the supply at that price and some means other than price must be used to allocate the price controlled good or service. Thus, the oil price control program went hand in hand with a crude and refined products allocation program. And,

as price controls on natural gas inevitably led to shortages, the Federal Power Commission had to establish allocation priorities.

Allocation rules are invariably more complex in consumer protection cases than in producer protection cases. Limiting price supported production raises the price of a good or service but does not limit its availability to the consumer willing to pay the higher price. Therefore, if something is "badly needed," it can be obtained. Ambulances can get gas, owners just pay more. However, in the case of a price ceiling, there is a shortage. Because the price is held below the market clearing price, the good or service is "sold out." In this case, there is no more gas to fuel the ambulance. Therefore, to accommodate changing social and economic conditions, programs that impose price ceilings are also likely to have a fairly complex, discretionary allocation elements, with the government holding oversight and intervention authority.

In fact the two consumer protection cases in our sample meet that expectation. As described in Sec. II, the petroleum allocation program consisted of a complex overlay of legislatively mandated allocation priorities and bureaucratic discretionary authority. Although more informal, the Federal Power Commmission's natural gas allocation program rests on the same model. In both cases, historic users were entitled to at least their historic allocations.[5] In the case of oil, surplus product could be allocated discretionally by the controlling government agency or by private market mechanisms. And in the event supply fell below base period historic use levels, both

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[5] In the case of natural gas, lack of a coherent program meant that historic users often had access to all the gas their suppliers had--more than their historic allocation.

programs provided for allocation on a "best use" basis to priority consumers according to complex need formulas. In neither case were allocation rights legally transferable.

Although Congress has been reluctant to use them, there are alternative mechanisms that prevent producers from capturing windfall gains. An example might be some form of windfall or excess profits tax where the proceeds are returned to the consumers of the good in question. Such devices have been and are being used. They are usually called upon, however, only after some form of price control has been found wanting. And often policymakers choose not to return the tax proceeds to the consumer of the good. Instead the monies go to the general fund, still leaving the consumer with the seemingly unreasonable price. The oil Windfall Profits Tax Act of 1980 offers a good case in point. Initially that legislation proposed to earmark much of the tax proceeds for energy research and subsidies, thereby compensating the consumer for his increasing energy bill. As the bill worked its way through Congress, restrictions on revenue use were whittled away until it was passed with none.

It seems likely that these alternatives to price control are not as politically attractive, because the consumer still encounters the higher price tag. It is immediate and tangible. The future complications and costs a price control program might incur are not.

Intra-Industry Wealth Transfers

As we noted above, there are also times when either government intervention or changing market conditions unevenly affect some group within an industry. In this type of case, government intervention will reflect an effort to compensate some segment of an industry for

dislocation and return the industrial participants to a prior competitive status quo. The oil quota program and oil price control program's entitlements represent two examples of such programs in our case study population. In both cases, government regulations created multiple prices for the same commodity, and users had uneven access to the cheaper supply. Those with less good access then stood at a competitive disadvantage as they sold their products.

Two key characteristics of these cases result in rights being allocated for the first time to actual users. First, there is not an overall shortage of the good. Only the cheaper version is scarce. Second, as we noted above, preserving the status quo in these cases means equalizing the burden of dislocation among members of the group. There is room for new entrants and no reason to exclude them. Therefore, new entrants as well as historic users are eligible recipients of rights.

If new entrants are eligible to receive rights for the limited resource, the program must be designed to insure that the new entrants are, in a business sense, bona fide new entrants--not entrepreneurs simply eager to cream off the value attached to the rights being conferred, but long-term industrial participants filling an economic niche. Under the voluntary oil quota program, the Department of Interior initially granted rights to purchase the cheaper foreign oil to importers. But entering the import business is relatively easy and cheap, and new entrants flocked to capture the valuable rights to the cheaper oil. To prevent this kind of skimming, DOI redesigned the program to make refiners the recipients of the rights--refining being a business that requires a major commitment of resources, suggesting a long-term business commitment.

Again, because no resource shortage exists and because these programs are not intended to protect any particular market member, rights are allocated on the basis of actual use. As a user's consumption varies, so does his allotment. And to insure that allocation quotas do respond to changing consumption levels, rights must be short-term and quotas recalculated frequently. Under such a program, new or growing businesses depending on the more expensive supply will not operate under a serious handicap and contracting businesses will not enjoy a great windfall when disposing of excess rights.

Whether or not rights are salable in these cases appears to depend on political considerations. According to Bohi and Russell, under the oil quota program, rights could not be sold, but oil could be exchanged, because cash payments would have made the program's cost to the consumer (equal to the value or the price of rights to buy cheaper foreign crude) extremely visible.[6] On the other hand, the oil entitlements program, part of a program subsidizing the consumer at the expense of the producer, permitted the sale of entitlements. It proved impossible to stop cash exchanges in the oil quota program, so, in fact, exchanges in both programs rested heavily on cash sales.

CHARACTERISTICS NOT RELATED TO TYPE OF PROGRAM

A number of program characteristics do not appear to be directly linked to program type. Rather, they seem to reflect more general political biases, evolutionary patterns applicable to all types of cases, or characteristics that flow from secondary program design features. Program biases favoring special economic groups or program

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[6] Bohi and Russell (1978), p. 279.

complexity do not seem to depend on program type. It is also interesting to note the spread in program costs and the demonstrable willingness of policymakers to mount costly programs to achieve, in some cases, limited results. For example, the Federal Power Commission has invested large sums in controlling the price of natural gas with, according to at least one analysis, little ultimate savings to the consumer.[7] Our costs of administering the entitlements program have also been enormous.

As we have noted at several points in the description of various programs, the allocation of rights to a limited resource may create structural biases in the market. There is no bias in programs where rights are auctioned or sold to users and are then freely salable. In that case, first as well as subsequent recipients pay for the resource and new entrants have unfettered access to the market. Once rights are given away to present users but sold to subsequent users, or any constraints are placed upon their transfer, biases are introduced in the market.

In subsidy cases the biases are clear. The programs give the rights to historic users and frequently restrict transfer, thereby inhibiting if not preventing new entry and normal market shifts. They do this intentionally, because their objective is to prevent the effects of market shifts, preserving the economic status quo.[8]

Biases also exist in programs where there is no intention to constrain market shifts. All the historic users, for instance in the

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[7] For a full economic analysis of the costs and savings resulting from that regulatory program see Breyer and MacAvoy (1974).

[8] For an extension of this argument see the Introduction to Owen and Braeutigam (1978).

externality cases, enjoy an advantage over newcomers who must buy expensive long-term rights to the limited resource. Similarly, where transfer is made difficult if not impossible, as in the case of spectrum allocation and off-shore leasing in the United Kingdom, new entry is likewise discouraged. Again, these programs favor the status quo. Programs that allocate short-term rights to actual users also favor the status quo, but to a lesser degree, because the value of the short-term right is limited and new entrants have access to the next round of distributions.

In addition to the bias favoring the structural status quo, several of the programs reflected a clear political concern for the "small business." The oil quota and oil entitlements programs subsidized small refiners by giving them greater access to the cheaper crude. Congress and organizers of lease auctions have made conscious efforts to adopt bid formulas that do not discriminate against the small developers. And it is likely that one objective in linking the transferability of acreage allotments to the sale of the land was to prevent the large farmers from buying up allotments and driving the smaller producer out.

Several evolutionary patterns emerge from an examination of the cases in our study. A number of cases demonstrate a tendency to use programs that confer rights to subsidize other, often totally unrelated, "good causes." Second, if there is a continuing relationship between the regulator and recipient, the program will also tend to grow increasingly complex over time. Third, in all programs, regulators seem to find it extremely difficult to change the rules--even those uniformly acknowledged to be bad.

Programs allowing the government to confer something of value inevitably tempt policymakers with multiple policy objectives. The rights from one program make a fine subsidy in another. Programs conferring rights on actual users are particularly opportune targets, because the recipient group is constantly undergoing change anyway, and slowly over the years new "good causes" or uses can be added to the list of recipients. In perhaps the most outstanding instance in our group of cases--the oil entitlements program--administrators authorized entitlements be issued to a number of recipients, in addition to the refiners. Over the years, the oil quota program rules were also set to favor many other policy objectives. Similarly, California's Air Resources Board proposed a setaside of banked rights for distribution to good uses including agriculture and alternative energy sources.

Several cases support our observation that if there is a continuing relationships between the regulator and the recipient, a program will grow more complex. Perhaps the oil cases provide the most outstanding examples. Programs that are more or less self administering, as in the case of truck operating authorities, offer little excuse or opportunity for increasing their scope or detail. Programs that are incompletely formulated when they are put into effect and programs that require continual reallocation invite additional regulation intended to correct for the unexpected.

Although slowly expanding the scope of a program may be commonplace, effecting significant change is not. Our case studies suggest that once program provisions have been adopted, players adapt rapidly to the new environment and soon have vested interests in the new

status quo. Once some have secured advantageous positions in the new context, they will oppose change.

In sum, our sample of programs that confer property rights strongly suggests that there are considerations that constrain policymakers in their choice of alternative program design options. Even across our diverse set of cases, clear allocative and implementation patterns emerge. The existence of these patterns would seem to indicate that the programs have been tailored to satisfy some underlying political requirements. We discuss the implications of these findings in the next section.

IV. OBSERVATIONS AND CONCLUSIONS

The observations prompted by this analysis imply several conclusions that should be of considerable use to the policy analyst. First, there appears to be considerable purpose in the structuring of regulatory programs that confer property rights; more purpose than many analysts have been willing to see. And this fact has strong implications for the future of policy analysis. Second, our case studies demonstrate that certain program design choices seem inevitably to beget certain consequences--certain secondary design choices, implementation decisions, or evolutionary characteristics. And third, once made, design choices seem extremely difficult to alter. Analysts, therefore, clearly need to understand and weigh the consequences of alternative program designs.

The results of the exploratory analysis conducted in the preceding section strongly suggest that the characteristics of regulatory programs that confer rights are not simply the random products of idiosyncratic interest group politics. Once the programs are typed, clear program design patterns emerge. Although the allocation criteria vary in cases that distribute publicly owned goods, in all cases the government attempts to extract reasonable compensation for the benefit conferred. All programs to control externalities and to protect producers confer benefits on historic producers or owners of the resource. Consumer protection programs use all three allocation criteria--historic use, actual use, and best use. And programs designed to equalize the effect of change on an industrial subgroup base their allocation of rights on actual use.

The basis for making allocations in our case group shows similar clear patterns. In programs that allocate rights to exploit publicly owned goods, rights are allocated on the basis of compensation (either monetary or behavioral) extracted from the recipient. Programs controlling externalities and protecting producers allocate rights on the basis of historic use or production. Programs protecting consumers allocate rights on the basis of historic use, actual use, and need, but show a strong preference for allocating them on the basis of historic use. And programs designed to equalize the effects of change on an industrial subgroup allocate rights based on actual use.

The characteristics defining the nature of rights conferred in the programs we examined show less consistent patterns, but they do suggest some patterns. Policymakers clearly share some reluctance to confer complete property rights, that is, rights that are vested in perpetuity and freely salable. Although some programs do permit the unrestricted sale of rights, many either link the transfer of the right to the sale of the real property to which the right attaches or forbid transfer altogether. Programs allocating rights to best users cannot then let those rights be transferred. Restrictions on the salability of rights also seem to occur in cases where sale would make the value of the right conferred highly visible, thereby inviting attack from consumer or taxpayer groups.

Most important, the design patterns that we observe across programs appear to have a common theme--the maintenance of the economic status quo. Both the choice of recipients and the basis for making allocations used in the programs seem to reflect an effort to deal with a problem

without causing any immediate, major redistribution of wealth. When the government wants to transfer a right, as in the case of the off-shore leasing, charging for that right maintains the status quo. When the right or economic standing is already formally or informally held by a group, as in the case of broadcast frequency use or acreage allotments, programs seem to be designed to respect that ownership to the degree possible. As the cases of programs protecting consumers demonstrate, exceptions may be required to distribute essential goods and services to non-historic users (e.g., allocating gasoline for ambulances), but by and large, historic rights dominate in program design and even more so in implementation.

The fact that there appears to be a reasonably consistent effort to adopt programs that do not significantly redistribute wealth--at least in the short run--suggests that political considerations may dictate that regulatory programs cannot disrupt the economic status quo. Many of these programs have been in place for years. Their consequences are well-known. Moreover, analysts have devoted considerable time recently to pointing out the inefficiences inherent in many of the programs in our study but with little effect. Their persistence in following traditional program designs suggests that policymakers are not poorly informed, but rather that they are constrained or guided by objectives many analysts may not fully appreciate. And our exploratory analysis indicates one such objective is to minimize the short-run redistribution of wealth.

Other analysts, while acknowledging political constraints governing the redistribution of wealth, conclude that compensating losers with the winne gains will permit the adoption of both efficient and

politically acceptable programs. They argue that efficient policies result in an aggregate increase in wealth. Therefore, it is possible in cases where an efficient policy would result in the redistribution of wealth to fully compensate the losers with only some of the gains of the winners, leaving everyone at least as well off as before. However, our case studies suggest that seemingly obvious compensation devices may be difficult to adopt and implement. The windfall profits tax on petroleum producers is an example of a case where the windfall was originally to be returned to many of those paying higher energy prices. But slowly the money was diverted to other uses, and in its final form, the program's enabling legislation made no effort to target those receipts on "losers." Furthermore, the fact that our cases demonstrate reluctance on the part of policymakers to accomplish most policy objectives with direct cash transfers or freely salable rights suggests that compensation may have to be quite indirect and hence complex.

It appears that political objectives and constraints may simply preclude the efficient design of regulatory programs that allocate property rights. But herein lies the challenge to the policy analyst. Rather than preaching efficient solutions, mindless of the political requirements constraining the policymaker, or judging the policymaking apparatus as hopelessly ensnared in the web of interest group politics, the analyst might explore and come to understand the political constraints. Then he might be able to innovate new policy options that were both more efficient than those customarily adopted and consistent with the broad political constraints that seem to play a major role in determining program designs.

This research also demonstrates that the analyst should explore the implications of alternative design choices if he is to provide the policymaker with an improved menu of policy alternatives. For example, rights generally appear to be conferred in perpetuity or on a long-term basis, thereby reducing administrative costs and the politically distasteful chore of remaking hard allocation decisions. Certain allocation provisions, however, preclude the allocation of long-term rights. If rights are allocated to actual users or on the basis of actual use, they must be reallocated reasonably frequently. The term of the rights allocated to best users must also permit the regulator to evaluate the recipients' performance periodically and to withhold rights from those not meeting standards. In practice, however, our cases suggest reallocation to new best users is politically difficult and unlikely.

Our case material not only suggests that the type of case strongly influences program design, but also that certain allocation decisions lead inexorably to other design requirements. Programs that allocate rights to best users provide a good example. Once that choice is made, it follows that rights cannot be transferred, that recipients behavior must be constantly reviewed, and that allocation and monitoring procedures will be very complex and costly. In short, the analyst must understand the link between design choice, implementation, and program evolution before he can tell what the adoption of a particular policy will bring.

And finally our research suggests the importance of understanding the implications of program design choices before policies are adopted.

Once they are in place, policies prove exceedingly hard to amend or abandon. Once the government makes a commitment to protect a group, that protection constitutes the status quo. Once programs are implemented, firms and consumers adjust. Again, those adjusted relationships become the status quo and prove very difficult to change. Hence there is little room for experimentation in policymaking.

This study, then, is a beginning. It clearly demonstrates there is much to be learned from comparative program analyses and suggests what some of those lessons might be. It also points to a number of areas where further work might fruitfully be undertaken.

BIBLIOGRAPHY

Alchian, Armen, Some Economics of Property, The Rand Corporation, P-2316, May 26, 1961.

Bohi, Douglas R., and Milton Russell, Limiting Oil Imports, An Economic History and Analysis, Resources For the Future, Johns Hopkins University Press, 1978.

Breyer, Stephen G., "Analyzing Regulatory Failure," Harvard Law Review, January 1979.

Breyer, Stephen G., and Paul W. MacAvoy, Energy Regulation by the Federal Power Commission, The Brookings Institution, 1974.

Coase, R. H., "The Federal Communications Commission," Journal of Law and Economics, Vol. 2, October 1959, pp. 1-40.

Cochrane, Willard W., and Mary E. Ryan, American Farm Policy, 1948-1973, University of Minnesota Press, 1976.

Dam, Kenneth W., Oil Resources: Who Gets What, How?, University of Chicago Press, 1976.

Edelman, Murray, The Licensing of Radio Services in The U.S., 1927-1942, University of Illinois Press, 1950.

Gaskins, D. W., and J. M. Voytko, "Managing the Transition to Deregulation," Law and Contemporary Problems, Vol. 44, Winter 1981.

Goldfarb, Robert S., "Compensating Victims of Policy Change," Regulation, September/October 1980.

Hochman, Harold M., and George E. Peterson, Redistribution Through Public Choice, Columbia University Press, New York, 1974.

Jamison, John A., and Karl Brandt Marketing Orders: Performance, Potential, and Limitations, Food Research Institute, Stanford University, July 1965.

Jordan, William A., "Producer Protection, Prior Market Structure and the Effects of Government Regulations," Journal of Law and Economics, Vol. 15, No. 1, April 1972, pp. 151-176.

Kitch, Edmund W., Marc Isaacson, and Daniel Kasper, "The Regulation of Taxicabs in Chicago," Journal of Law and Economics, Vol. 14, No. 2, October 1971, pp. 285-350.

Krasnow, Erwin G., and Lawrence D. Longley, The Politics of Broadcast Regulation, St. Martins, New York, 1978.

Lipson, Albert J., Efficient Water Use in California: The Evolution of Groundwater Management in Southern California, The Rand Corporation, R-2387/2 CSA/RF, November 1978.

MacAvoy, Paul W., and John W. Snow (eds.), Regulation of Entry and Pricing in Truck Transport, Ford Administration Papers on Regulatory Reform, American Enterprise Institute for Public Policy Research, Washington, D.C., 1977.

Majone, Giandomenico, "Choices Among Policy Instruments for Political Control," Policy Analysis, Vol. 2, Fall 1976, pp. 589-613.

Mann, Dean E., "Political Incentives in U.S. Water Policy: Relationships Between Distributive and Regulatory Politics," What Government Does, in Matthew Holden, Jr., and Dennis L. Dresang (eds.), Sage Yearbooks in Politics and Public Policy: Vol. 1, Sage Publications, Inc., Beverly Hills, California, 1975.

Montgomery, W. David, A Case Study of Regulatory Programs of The Federal Energy Administration, California Institute of Technology, Social Science Working Paper #147, January 1977.

Ostrom, Vincent, The Choice of Institutional Arrangements for Water Resource Development--With Special Reference to the California Water Industry, National Water Commission, Report #SBS-71-009, December 1971.

Owen, Bruce M., and Ronald Braeutigam, The Regulation Game, Ballinger Publishing Company, Cambridge, Massachusetts, 1978.

Posner, R. A., "Theories of Economic Regulations," Bell Journal of Economics, Vol. 5, Autumn 1974.

Quinn, Timothy, Distributive Consequences and Political Concerns: On the Design of Feasible Market Mechanisms for Environmental Control, The Rand Corporation (forthcoming).

Shepard William G., and Wilcox Clair, Public Policies Toward Business, Richard D. Irwin, Inc., Homewood, Illinois, 1975.

U.S. Congress, Senate Committee on Governmental Affairs, Study on Federal Regulation, Framework for Regulation, 96th Congress, 1st Session, December 1978, p. 305.

Warner, Lettie McSpadden, "Pollution Control, Implementation Alternatives," Policy Analysis, Winter 1978.

Wolf, C. W., "A Theory of Non-Market Failure: Framework for Implementation Analysis," Journal of Law and Economics, Vol. 22, No. 1, April 1979, pp. 107-140.